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TRANSLATIONS ON EASTERN EUROPE

SCIENTIFIC AFFAIRS

No. 565

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ROMANIA

BULGARIA

RESEARCH WORK IN BIOLOGY OUTLINED

Sofia OTECHESTVEN FRONT in Bulgarian 15 Oct 77 p 3

[Article by Georgi Sveshtarov: "Biology on the Offensive"]

[Text] A great part of the biological research in our country is carried on at institutes and central laboratories of the Unified Biology Center of the Bulgarian Academy of Sciences. The chief goal is fundamental and combined fundamental and applied study of the nature and basic mechanisms of living phenomena at the molecular, cellular, organismal and population level. How important these studies are is obvious from the decision of the Political Bureau of the BCP Central Committee of 9 August 1976 regarding the development of the biological sciences. This party document attributes great significance to the treatment of especially important theoretical and methodological questions by which timely assistance will be rendered to the national economy.

Scientific Research of a Fundamental Character

In recent years our institutes have obtained valuable results in scientific research of a fundamental character. Thus, for example, questions involving clarification of the role of certain proteins in the functioning of the cell's genetic apparatus are being successfully dealt with. A number of biologically active substances have been synthesized, with especially great hopes placed on the antitumor drug "Cydrin," which exhibits the ability to block the development of malignant tumors in animals. New mechanisms have been revealed, namely the mechanism governing the gastrointestinal tract's motor activity and the mechanism of visual perception, and new possibilities of counteracting certain poisons have been found. Important research has been done on the control and self-regulation mechanisms in plant organisms, which is of great significance for finding ways leading to an increase in their productivity. The scientific contributions to investigations of leukoses in poultry are very important, as are the regularities we have found which are of great significance for the virus theory of malignant cellular degeneration. Of very great significance are the multifaceted investigations by our botanists, zoologists and helminthologists of the flora and fauna of our country -- investigations which are of a regional character and of great benefit to the national economy.

Combined Scientific and Applied Studies

Apart from fundamental research, our institutes pay great attention also to combined scientific and applied studies.

The Institute of Morphology has worked out tables characterizing the sole of Bulgarians, which will find application in the footwear industry. The same institute has created a method for the investigation of cells, intended for early diagnosis of blood disease and tumors.

The Central Biophysics Laboratory has developed several models of spectrophotometers which are used for research on ultra-high-speed processes. Three of the 170-A models have been sold to Soviet scientific institutes. Specialists from the same laboratory have designed and introduced into the entire national health-care network the "Telecard" device, by means of which electrocardiograms are transmitted by telephone.

The Institute of Biology and Immunology of the Reproduction and Development of Organisms has developed and introduced a method for the twice-yearly impregnation of ewes, by which an economic effect of hundreds of thousands of leva is being realized. It has also introduced a method of single-stage spawning for carp, the economic effect of which amounts to about 150,000 leva.

The Forestry Institute has introduced 10 studies involving typological principles of forest management in our country and new methods for increasing the resin productivity of the white pine.

The Zoological Institute has proposed a method of increasing the fish productivity of carp hatcheries by portion-controlled fertilization of basins with calcium oxide. It is expected that this method will be introduced in all of the country's fish hatcheries since 180 decares of fish-stocked area yields an economic effect of about 350,000 leva.

The Institute of [word illegible; possibly Botany, or Genetics] has introduced new varieties of tomatoes, peppers and tobacco. The economic effect exceeds several hundred thousand leva. And the M. Popov Plant Physiology Institute has introduced a method for the chemical pinching of tobacco by means of maleic hydrazide. Another development has brought about a reduction in the pre-harvest dropping of apples and the economic effect realized is also calculated at hundreds of thousands of leva.

As can be assumed, the above-indicated examples represent only a small part of the many scientific developments that not only have national significance, but have also contributed to the international recognition of our biological sciences.

6474
CSO: 2202

BULGARIA

PROFILE OF TWO YOUNG SCIENTISTS INVOLVED IN INTERCOSMOS PROJECT

Sofia TRUD in Bulgarian 27 Oct 77 p 2

[Article by Vera Tancheva: "An Earth-Based Dialogue About Space: Bulgarian Apparatus in Earth Orbit; What the 18th Space Nation Gives to Science; Meet 'Miss Intercosmos'"]

> [Text] Ten years ago the program of cooperation among the socialist countries in the conquest of space was adopted. The Soviet Union made space rocketry available to Intercosmos scientists in order to launch their own scientific apparatus into space -- this huge natural laboratory with unique conditions for scientific research. But out dialogue will be conducted on the planet earth . . . in a small scientific laboratory for space research at the Bulgarian Academy of Sciences.

Curious? Or mysterious? No. Everything here looks like our world -- both the rooms and the people with their winning cordiality. The laboratory director Professor Kiril Sarafimov is "torn" between earth and space concerns and problems. His colleagues bestride terra firma, but "fly" in the clouds and the starry firmament. Not as visionaries. Simply as scientists and specialists concerned with a sacrament -- space physics. Or, to be more precise, with ionospheric physics . . . in order to study this vitally important transmission between earth and the boundlessness of space by means of their own scientific apparatus . . . by direct "sounding" of the ionosphere -- the circumterrestrial plasma.

This is one of the main lines of inquiry which our scientists and specialists have selected from the Intercosmos program. And they work with complete absorption. In the small earth-based laboratory discoveries are made, space information is "decoded." From here our instruments, our apparatus, set forth on their path to the limitless reaches of space. Some of their creators have had the good fortune to be present at the spaceport, to thrill in expectation of the results of the tests, to observe "live" the launching of Intercosmos satellites. Anybody would envy them.

Here everything is on earth. But Engineer Tanya Ivanova ("Miss Intercosmos") and Engineer Medi Astrukova are engaged in space matters.

Engineer Tanya Ivanova, staff scientist, is among these lucky ones. Professor Sarafimov introduced her under a "foreign" name. "Meet our 'Miss Intercosmos.'"

An earth woman. A beautiful Bulgarian woman. Mother of two children. Chief designer of the first Bulgarian instrument (P-1) that flew on Intercosmos-8 in December 1972. Then it was she was christened "Miss Intercosmos." She was the first woman scientist at the spaceport of foreign specialists. What was it like? It is hard for her to tell. She is afraid lest the enchantment of this bedtime story should pale. She recalls looking after the carrier rocket. The fiery trail became smaller and smaller until the glowing dot disappeared among the large stars over the taiga.

The first telemetric recordings were received at the spaceport at daybreak. All instruments were operating normally, including the Bulgarian instrument. It had passed the test.

After this first "space flight" of Bulgarian science, our country, in conformity with the UN convention, was recognized as the 18th space nation in the world. This was the beginning of space-instrument manufacture in our country.

"On Intercosmos-1, put into orbit in October 1969, we didn't have even one resistor. At that time we had hardly begun. A space-physics group was set up. Later on we became a laboratory -- with a staff of enthusiasts. No, there was no skepticism, no lack of faith. Everybody backed us up. The first successes came -- the first space launchings of our instruments. How happy we were . . . But if it had not been for the Soviet Union and Soviet scientists and specialists, we would not see this space dialogue today.."

Engineer Tanya Ivanova ticked off by date and year the birthdays of the unique Bulgarian space instruments that flew on board the research satellites Intercosmos-8, Intercosmos-12, Intercosmos-14 and on the heavy geophysical rockets Vertical-3 and Vertikal-4.

Does the Bulgarian apparatus do a good job? Doesn't it "act up" in limitless space?

"Space is the last stiff test. Before it gets clearance for flights anywhere, every instrument goes through many complex ground tests."

How about the people who created them? What stress they must be under before every space flight! Until the ready command is given . . . until the carrier rocket leaves its pad . . . until space "begins to speak." Every country of the Intercosmos family stakes its prestige, doesn't it?

"What we have aimed for is that every instrument should be more perfect, more functional; have less weight and less volume, but carry more information about the complex phenomena and processes in circumterrestrial space; and have a longer life. Every one of the five instruments that have operated on satellites of the Intercosmos family and on the Vertical heavy geophysical rockets is unique."

Engineer Medi Astrukova cut into the conversation. "We don't have any 'series' production. Everything is unique."

She is one of the younger instrument makers, but is "fired up" by the spunk of her veteran colleagues.

Space launchings! What do they contribute to the fundamental sciences and to our mundane affairs? Just intense experiences and glory?

"From our sounding-measurement instruments," Engineer Ivanova said, "valuable scientific information is obtained about phenomena and regularities in the upper atmosphere that are of interest to us. After thorough study of the results we arrive at interesting and unique scientific solutions. A 'middle-latitude gap' in the distribution and concentration of oxygen and hydrogen ions at different heights has been discovered. We

know much more now about the behavior of the equatorial anomaly under evening conditions and about the behavior of the equatorial ionosphere. Regularities in the production of heavy molecular ions in the polar regions have been discovered.

Our science is enriching its "space" curriculum vitae -- with scientific research and discoveries, and with a new specialization -- space-instrument making. That specialization has brought us recognition -- and experience for new developments and experiments and for Bulgarian science's participation with its own apparatus in the launching of heavy orbital automatic stations.

6474
CSO: 2202

BULGARIA

BRIEFS

NEW TELESCOPE IN BULGARIA--The assembly work of the 2-meter mirror telescope at the National Astronomical Observatory near Smolyan began today. Specialists of the Carl Zeiss collective as well as of the Bulgarian Academy of Sciences and the Transstroy management are engaged in this work. [Sofia BTA Domestic Service in Bulgarian 1434 GMT 14 Nov 77 AU]

CSO: 2202

STATUS, ACTIVITIES OF CZECHOSLOVAK ACADEMY OF SCIENCES DESCRIBED

Prague DOKUMENTACNI PREHLED in Czech No 39, 1977, pp E-1 - E 6

[Excerpts from unsigned article]

[Text]

Seat
Prague

Status

The most outstanding scientific workers are organized in this top-level scientific institution of the Czechoslovak Socialist Republic. The Czechoslovak Academy of Sciences was established on the basis of the law number 52/1952 of SBIRKA of 29 October 1952, which came into effect on 12 November 1952. The law on the Czechoslovak Academy of Sciences (CSAV) was revised by the law number 53/1957 of SBIRKA of 31 October 1957. The new law has given the CSAV new assignments and new rights. According to the revised law, the 7th general assembly of the CSAV adopted the CSAV statutes which regulate in greater detail its internal affairs. Changes in the state, particularly the adoption of the new socialist constitution, have required a further revision of the law on the Czechoslovak Academy of Sciences by the law number 54/1963 of SBIRKA of 9 July 1963. This law, amended by the legal provision of the Presidium of the Federal Assembly number 26 of SBIRKA of 19 March 1970 is the basic legal norm of the CSAV. On the basis of this law and the legal measure of the Presidium of the Federal Assembly, the general assembly of the CSAV approved on 25 July 1970 the new provisional statutes of the CSAV, which was approved by the CSSR government by the resolution number 254 of 25 October 1970.

Activities

The main tasks of the CSAV are research work which controls and coordinates the activities in the area of basic research, cooperation in applying the results of scientific research in practice and in their popularization, coordination of scientific contact with foreign institutions. Many significant results in all scientific fields have been achieved in work centers of CSAV in the area of research activities. A number of the results were used and found their direct application in social practice. The CSAV is concentrating during the Sixth Five Year Plan primarily on 16 key tasks, which can make a significant contribution to the implementation of the task outlined by the 15th Congress of the CPCZ by the general trend of their content and by the planned goals. These include in particular the area of expansion and complex utilization of the domestic raw-material base and rational creation and evaluation of materials. Scientists continue to concentrate on effective procurement, transmission, and utilization of energy, on the development of electrotechnical engineering, and on optimization of the control of complex processes. Other matters which will be the center of their attention will be questions of rationalization of agricultural production, prevention of diseases which are serious from the social point of view, improvements of the protection and creation of the living environment, and so on. Outlays for the development of science and technology are to increase during this five year plan from the present 14 billion korunas annually to 18 billion, which represents roughly 3.8 percent of the national income.

More than three quarters of the research capacity of the CSAV centers concentrate at the present time on implementation of the state programs in basic research. A portion of the research capacity is concentrated on cooperation in dealing with tasks of state programs of technical development.

The CSAV has signed up to now 10 framework agreements with general directorates of economic production units, such as the Hutnictvi zeleza (Iron Metallury), Kovohute (Metallurgical Works), Skoda in Plzen, Ceskomoravska Kolben-Danek in Prague, Heavy Current Electrical Engineering Works, Tesla, Instruments and Automation Works, Paper and Cellulose Industry, Spofa, and Chemopetrol. These agreements are based on efforts to establish a closer contact with the industry and to create conditions for closer association of basic research with the production sphere. They contribute their share to an organic amalgamation of all elements of the research-development-production-application cycle.

In terms of the future development of the Czechoslovak basic research, cooperation of the CSAV with the Soviet Academy of Sci-

ences is very important. Systematic cooperation was initiated in 1953. The current plan of scientific cooperation includes 37 problems, which contain 133 themes in the areas of natural, technical, medical, and social sciences. In the Interkosmos program, Czechoslovak and Soviet specialists are preparing instruments which are technologically highly complicated.

What is becoming more and more important is cooperation between the CSAV and its centers in scientific programs within the framework of CEMA. This cooperation will be expanded considerably and brought to a higher degree of coordination during the Sixth Five Year Plan as compared to the previous five year plan. More than 50 centers of the CSAV (including 18 centers of the Slovak Academy of Sciences) participate in this multilateral scientific-technical cooperation. During the five year plan, these centers will deal with tasks which ensue from approximately 100 themes. The cooperation is projected this year into 240 sectional tasks of the state plan in basic research.

The CSAV is included in the optimal way in the process of socialist integration in science, and it uses its foreign contacts for purposes of close cooperation in the area long-range plans of science and research of countries of the socialist community. Through contacts with scientific institutions of advanced capitalist states, it gets at the same time further knowledge from all kinds of top-level centers. It strives to intensify and expand these contacts with a number of scientific organizations of west European countries, United States, and Canada. This is done on the basis of agreements signed concerning exchanges of workers and in the state of the conclusion of the Helsinki conference on security and cooperation in Europe. The CSAV participates actively in international government and non-government organizations. Its participation is significant for example in scientific programs of UNESCO, particularly in the intergovernmental program "Man and Biosphere", the international hydrobiological program, or in the international programs of geological correlations. It also participates in programs and drives of the World Health Organization. The CSAV is a member of the International Council of Scientific Unions (ICSU), 15 unions associated in the ICSU, 7 special committees ofthe ICSU, and in 12 international unions which are outside of the ICSU. . . .

Organizational Structure

In the area of basic scientific questions, the CSAV is the main advisor of the government, and it is responsible directly to the government for its activities.

The Slovak Academy of Sciences is an organic component of the CSAV and at the same time the highest national and regional

scientific institution in Slovakia.

The top-level organ of the CSAV is the general assembly of the members of the academy. This assembly makes decisions concerning basic questions pertaining to the task of the CSAV and basic questions of organization, it determines the principal trends of activities and further development of the academy. At the motion of the presidium, it selects members of the academy and members of the presidium. It submits the results of the elections to the presidium as a proposal to be submitted to the Czechoslovak government. The general assembly meets as a rule once a year and is called into session by the presidium of the academy.

The academy is headed by the chairman of the CSAV, who is nominated from the ranks of academcians and removed at the proposal of the government by the president of Czechoslovakia. The chairman of the academy is responsible for the performance of his function to the Czechoslovak government.

The central control organ is the presidium of the CSAV. It is responsible to the Czechoslovak government for the activities of the academy. The members of the presidium are the chairman of the CSAV, vice-chairman, the general secretary and his deputies, and additional members. The members of the presidium are nominated and recalled by the Czechoslovak government, as a rule on the basis of elections ofmembers of the academy in the general assembly.

The basic conceptual and scientific organs for individual scientific fields are scientific collegia of the CSAV. Each scientific collegium is headed by a chairman, who directs all its activities and is responsible for these activities to the presidium of the academy. Scientific collegia hold sessions as needed, but as a rule once a month.

The centers of scientific-research activities of the academy are its scientific work centers. These are as a rule units which are independent from the organizational point ofview. Scientific work centers are established and abolished by the presidium of the CSAV.

The administrative, economic, and organizational agenda of the CSAV is handled by the executive apparatus: the Secretariat of the Presidium of the CSAV, which is subordinated to the chairman of the CSAV, and the Central Administration of CSAV Work Centers which is directed by the general secretary of CSAV.

Chairman of the CSAV: CSAV Academician Jaroslav Kozesnik

Vice-chairmen of the CSAV: CSAV and SAV Academician Vladmir Hajko, CSAV Academician Josef Poulik, CSAV Academician Bohumir Rosicky.

General Secretary of the CSAV: corresponding member of the CSAV Karel Friml.

Membership

The members of the CSAV are nominated by the Czechoslovak government, as a rule on the basis of elections held during the general assembly of members of the academy. The members of the CSAV are regular members -- academicians, 49 of them at the present time, corresponding members, 149 of them, and also foreign members and honorary members.

5668
CSO: 2402

TWENTY YEARS OF NUCLEAR REACTOR DEVELOPMENT IN CSSR

Prague TVORBA in Czech No 40, 5 Oct 77 p 11

[Article by Ivan Bures: "Third Youth of a Reactor"]

[Text] Twenty years ago, on 24 October 1957, the first nuclear reaction took place in a Czechoslovak reactor at Rez.

The first Czechoslovak reactor was built in the quiet environment of Rez, a restful place in the Vltava River valley.

It has been exactly twenty years ago when the high "boiler" hidden in an extensive construction below the afforested slopes became a proof of the growing scientific-technical cooperation of socialist states. Hardly eight years have elapsed since the first Soviet reactor was put into operation on 18 January 1955, when Czechoslovakia received an official offer from the Soviet government to give overall assistance in the planning, delivery of installations, and construction of an experimental nuclear reactor. At that time, there still was a really small number of such reactors in the world. The entire Czechoslovak government hoped that its own reactor will not only promote nuclear physics accelerated by the latest technology, but that it will also bring unheard of prospects for the entire society, which could only gain from peaceful applications of nuclear energy.

One of those who attended the event, Engr. Frantisek Kasak, present deputy director of the Institute for Nuclear Research in Rez, reminisces: "Things were going fast at that time. The Soviet Union delivered to us complete documentation for the construction and technological part, and also a reactor for ourselves and all installations, including heavy current electrotechnical equipment, instruments, and installations for control and regulation equipment. The installation work was done at that time with participation of Soviet experts practically on a turnkey basis and at such a rate of speed, that Czechoslovak operators could start the reactor in Rez only two years after the signing of the first Czechoslovak-Soviet agreement on the development of research of the physics of atomic nuclei and on the use of nuclear energy for purposes of the national economy."

The present Institute for Nuclear Research in Rez is an extensive complex of many buildings, some of which bear the architectonic seal of urbanism of the 1950's, while other buildings reflect the shine of the glass and aluminum, showing that the buildings have been constructed recently. Finally, strict health barriers finally enabled us to visit the jubilarian of today. Twenty years is a respectable age for a scientific instrument during the era of the so-called great science. The only thing is that the Czechoslovak reactor went through a double rejuvenation treatment, and so it can continue to serve. It carried out its assignments without any deviations, assignment to which it has been dedicated, namely to be a research reactor, to produce radio isotopes, to serve all branches of nuclear physics and biology, and also to help in the construction of nuclear electric power plants. 'It became for Czechoslovakia a real gate opening to the atomic era. When it started to operate, only a few medical centers were using radio-isotopes -- naturally those centers in particular which were located in Prague. There are now about 50 of them all over the Republic. And they are not idle. Last year alone, they conducted more than 200,000 examinations. The institute in Rez handles research and production of rare and important radio pharmaceutical preparations. One of them is for example o-iodine-hippurane, which bears the designation of iodine 131. It is indispensible in examinations of kidneys.

The area of peaceful application of nuclear energy represents a truly broad spectrum of such applications. One of them is neutron activation analysis. Its main advantage is a high degree of sensitiveness, thanks to which it is possible to determine a large number of individual elements. These analyses of biological materials of animal and vegetable origin provide invaluable services for the Czechoslovak agriculture, food industry, and medicine. For example, activation analysis which traced the content of zinc, copper, iron, cobalt in fodder doses contributed a great deal to the improvements of the quality of raising pigs on a large scale. The method is also a significant aide of geologists, for example in prospecting for mineral raw materials. It makes it possible to determine toxic and vitally important trace elements during control of pollution of the living environment. The struggle against poisoning by carbon disulfide was made easier by the study of changes in the content of copper and zinc in the nervous tissue of rats.

Research workers who prepare the technical foundations for projects of future nuclear power electric plants have been particularly successful in utilizing those twenty years. "Since the beginning of the 1960's, we have been conducting technological research by means of loops which are installed in the reactor. At first, we used a gas loop with carbon dioxide where research was conducted related to the development of nuclear electric power plants of the type of the Czechoslovak A plant. Later on, there was added the so-called water loop designed for studies of corrosion in a radiation environment. At the present time, we are building a pressure reactor loop with parameters of the WWER reactors, which will be the heart of our future atomic electric power plants. In the research on materials, we concentrate on the knowledge of radiation properties of stainless steels, which will be used in the manufacture of reactor containers at the Skoda Works is Plzen. By means of sonds installed in the reactor, we are conducting now also a de-

manding research program concerning the properties of zirconium coatings for making improved nuclear fuel."

Within the framework of the joint Czechoslovak-Soviet program of the development of atomic energy, there gradually forms at this place a increasingly accurate concept of the future types of reactors, in which it will be possible to use the energy of uranium much more efficiently than it is done for example in the case of light water reactors. These are the so-called fast reactors, which produce not only electric power and heat, but also a new fuel -- plutonium -- as a by-product. No wonder that tremendous efforts are being made to do research work on this type of reactor. Indeed, the value of uranium increases 50 times by using this type of reactor.

Rez has trained most of the operators employed in the Czechoslovak atomic electric power plants. Students from the faculty of nuclear and physical engineering have been getting extremely valuable operational experience at that place.

Comrade Kasak says: "We have enough worries to warn us against becoming rigid. Some twenty years ago, a reactor could operate with an output of up to 2 megawatts. This output was adequate particularly in biological research -- simply for those types of irradiation which involved the risk that the samples could be burned, if a reactor with a higher output was put into operation. On the other hand, such production is too small today, when we handle a number of contemporary problems of nuclear energetics. By improving the fuel elements, we were able since 1964 to increase the output under favorable cooling conditions to as much as 4 megawatts. Then in 1974, acting in cooperation with I. V. Kurchatova Institute for Nuclear Energy in Moscow, we proceeded with a second extensive reconstruction work, with has created conditions for increasing the output of the reactor gradually to as much as 10 megawatts. That is why we had to reconstruct the active zone of the reactor, modernize the cooling circuits, exchangers, pumps, pipes, and change entirely the concept of control and regulation. Thanks to this reconstruction, we are able to dare to proceed with highly demanding experimental operations. And in addition, all these experiments can be carried out faster: the flow of neutrons has increased 5 times!

During the rejuvenation process, the reactor itself grew in size. A proof of that are the small steps which had to be added to the original bridge leading to the top of the pressure container. And there is always something to improve. For example, scientists have figured out now an installation by which it is possible to insert and remove irradiated samples while the reactor is in full operation. A pneumatic postal service "brings" them from a distant laboratory, only to pick them up again by remote control for use in their hot chambers . . .

We are inspecting the plans of the operations of the "jubilee" week. The reactor is to operate with an output of 6 megawatts. Its task will be to irradiate materials in sondes and to work for "customers" from the outside of the institution. A team of 41 members servicing the reactor will take

advantage of that to carry out its own measurements at the same time.

The reactor which has been rejuvenated twice must not be idle. Up to now, it actually did not have time to be idle.

When the author of this article left the gates of Rez, a young man stopped him. He explained that he was in a great hurry, because he had to catch the Ostrava express. He turned out to be one of those "customers". He brought gold for irradiation, which makes it possible to study processes involved in making steel alloys. "Do you know, I never could imagine that altogether 7 milligrams of radioactive isotopes admixed to 70 tons of steel will reveal clearly everything that is happening during the smelting process . . . " To this metallurgical engineer, the role of nuclear energy in his field was obsolutely self-evident. And the fact that in addition he was able to conceive it as a tremendous miracle indicates that he has the sense and feeling for the beauty of the things which became part of his daily practice. And yet, it was only twenty years ago when scientists in Czechoslovakia gained their entry into the nuclear era.

5668
CSO: 2402

SOCIALIST COOPERATION IN SPACE DISCUSSED

East Berlin FORUM in German No 18, 2 Sep 77 p 6

/Gert Lange interview with Dr Ralf Joachim, deputy director, Institute for Electronics, GDR Academy of Sciences: "The Earth Through Cosmic Eyeglasses"/

/Text/ /Question/ The most recent experiments undertaken by the Interkosmos socialist research organization lead us to believe that a new phase of joint cosmic research by the socialist states has been initiated. What characterizes the higher quality in comparison to earlier experiments?

/Answer/ It is true that several phases have already become evident during the 10-year development of Interkosmos cooperation. Nor is the present work in our field merely the continuation of a regular routine -- with different goals -- on the contrary, it is clearly pointing up historical landmarks. During the first phase of Interkosmos cooperation, the primary responsibility of the scientists and technicians from participating socialist countries was that of learning from the vast experience of the Soviet collectives. That is of course also true today, but at the outset it was primarily a one-way street. The experiments conducted by the GDR and the other participating countries were relatively limited. It was a matter of developing small, automatic flight instruments for measuring physical phenomena in space, establishing their functional capabilities and analyzing data. From the beginning, four major directions were pursued: cosmic physics, cosmic meteorology, cosmic communications and cosmic biology and medicine.

Sometime between 1973 and 1974 we were able to take further steps jointly with other socialist countries. The experiments -- often combinations of satellite and ground measurements -- became complex. Compared to the first phase, the instruments carried on board as well as the scientific objectives were of a quite different order. Understandably, this also required a better quality of cooperative work among the partners. An example taken from this phase is the

uniform telemetry system tested for the first time in 1976 using the Interkosmos 15 satellite. The telemetry system was a prototype for the transmission of data from the satellite to the earth. Several socialist states worked together on this system.

The most recent phase of development is characterized by two things in particular. One is a new line of research, remote exploration of the earth using aerocosmic means. This new direction is assuming ever increasing proportions within research programs. The other is participation in the USSR's manned space flight program. This is the result of acknowledging the economic necessity of increasing the practical applications of cosmic research for the benefit of socialist society.

Still fresh in our minds is the experiment with the MKF-6 multispectral camera on board Soyuz 22. This was the first step in the direction of participation by other socialist countries in Soviet manned space activities. The great economic benefits derived from the photographs taken with the MKF-6 have already been recounted. The concentrated shift to projects of direct economic benefit within Interkosmos cooperation really began, however, as early as May 1976 with the use on the Soviet "Meteor" satellites of a quite extensive instrument complex developed by the GDR.

/Question/ What is this type of satellite designed to do?

/Answer/ The name "Meteor" is assigned to a series of Soviet weather satellites which are used not only for meteorological research. They have already been used operationally to observe the weather and have collected data for the weather service. These satellites are therefore also equipped with Soviet weather-mapping equipment.

The instrument complex supplied by the GDR, the core of which is a so-called Fourier spectrometer for the wave length range from 6 to 25 micrometers, measures the radiation intensity of the earth's atmosphere in the infrared range. The end result is a series of readings on the radiation intensities of carbon dioxide, water vapor, ozone, methane and other atmospheric admixtures. Analyzed by means of electronic computers, these readings provide information on meteorological relationships between altitude, temperature and water vapor.

In June of this year an improved Fourier spectrometer was sent into orbit aboard another "Meteor" satellite. Data derived from the spectrograms show a high degree of precision. The temperature profiles and elements of the atmospheric layers that affect weather may never before have been determined so precisely.

Incidentally, also characteristic of the advanced stage of Interkosmos cooperation is the fact that the GDR and other socialist countries are participating in the development of experimental equipment for space craft, a task that previously had been the exclusive domain of the Soviet national space research program. In addition to the well-known multilateral experiments with the "Interkosmos" satellite series, the "Vertikal" missile series and meteorological rockets, greater use has been made of opportunities for bilateral cooperation.

/Question/ You spoke of greater dimensions with regard to Interkosmos experiments. Will this make the instruments and equipment carried on board satellites more extensive?

/Answer/ Not necessarily; it is different in each case. A complex instrument system naturally requires a substantially larger outlay for equipment technology. That applies in equal measure to measuring apparatus on board, power supply on board and analytical equipment on the ground. One of the general requirements placed on space research is therefore that of steadily reducing technological expenditures. Just a few years ago, for example, it was thought that a Fourier spectrometer with all of its peripheral equipment could not be installed in a satellite. It was very large, heavy, sophisticated and highly sensitive. We succeeded in miniaturizing the electronic and precision optical components in such a way that it was possible after all to install an instrument complex of this type.

From an overall standpoint, you are right. Many complex experiments also call for more extensive apparatus. It was for this reason, and also so that several experiments could be run parallel to one another, that with Interkosmos 15 a new type of satellite was introduced -- the Automatic Universal Orbital Station (AUOS). This satellite is larger, thus enabling it to carry a greater payload.

/Question/ More comprehensive experiments -- more information. What demands are confronting cosmic data collection and processing today?

/Answer/ It takes a great many hours of work with computers to analyze the very great volume of data. For example, the measuring data derived from the Fourier spectrometer as well as multispectral photographs taken by Soyuz 22 are still being analyzed. This is even more true of their significance in terms of meteorology, geoscience and other economic purposes. This flood of data produces substantial problems as regards computer technology. A single multispectral photograph has several million bits /binary digits/ of information -- this due in part to the extraordinarily good spectral and spatial detail. With its six channels, however, the

MKF-6 produces six photographs with a single exposure. It follows that all possible combinations of this information can and must be explored. This requires special improvements in computer technology involving process technology as well as peripheral technology. Some good results have already been obtained in this area as well.

Quantities of data such as these also pose new problems involving memory capacities on the ground and interim memory capacities on board. Within the framework of Interkosmos cooperation, the Institute for Electronics must therefore work on selected topics dealing with signal and system theory and signal processing. Some very interesting reception concepts have been developed. An example is the WES-2 weather map receiving system, developed in cooperation with the academy's Center for Scientific Instrument Development. Used on more than one occasion were on-board memory facilities with increasing memory volumes. These were developed jointly by the Academy of Sciences' Central Institute for Cybernetics and Information Processes and the Institute for Electronics.

The trend is toward condensing the volume of data and keeping it as small as possible on board as well as on the ground, collecting only essential data and filtering out all that is "redundant" in terms of a specific scientific problem so that the memory capacity is not burdened unnecessarily.

/Question/ The scientists and technicians of your institute are working hard and very closely with experts from the Soviet Union and other countries. What is your assessment of the atmosphere surrounding the work?

/Answer/ It would no longer be sufficient to characterize the working methods used in the Interkosmos committees and collectives simply as coordinated work on joint projects. A good division of labor has developed along with a true sense of socialist teamwork and collective spirit that goes beyond national boundaries, a comradely atmosphere in which friendly personal relationships have also been formed. Another aspect of such a good atmosphere is that professional differences of opinion are thrashed out openly and at times vehemently. A good knowledge of Russian is an obvious prerequisite.

Close international cooperation certainly entails many a problem as well. It has to be precisely organized. The institute's employees must also cope with the amount of travel that is necessary, and these are not pleasure trips. The consultations that are often too long for a normal workday and the technical inspections of instrument systems prior to satellite launches are very strenuous phases of the work. On the other hand, however, these are also enduring experiences that make an impression because they constitute the tangible results of research cooperation. It is for this reason that each visit in the Soviet Union instills in us new enthusiasm.

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IMPLEMENTATION OF SCIENCE POLICY EVALUATED

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[Article by Mihaly Kornidesz, department head of the Central Committee]

[Excerpts] In formulating the science policy guidelines, the Central Committee realized the increasing social importance of science and decided that the sums expended for research and development must increase at a faster rate than the national product increases. This principle has been followed during the last eight years. The expenditure for scientific research and technical development increased between 1969 and 1975 from 6.4 billion forints to 15 billion forints, meaning an increase from 2.5 to 3.5 percent of the national product. (It should be noted, however, that some of the resources were expended not for strictly research and development purposes but for purposes such as documentation and propaganda. According to conservative estimates, we spend 2.6 percent of the national product on research and development.) This ratio is more or less in line with international levels, and it indicates also that the extent of our research and development activities is such that they are practically industrial in size. A similar situation exists also in terms of the number of research and development employees (including those who teach at institutions of higher education). Their number is now more than 80,000; this is one-third more than in 1969.

However, these major quantitative indexes of the growth of the research base cannot cover up the fact that the utilization of the research funds was not sufficiently concentrated so that, in spite of the major increases, our research and development projects are still not supplied sufficiently with the needed instruments. Nor has there been an increase in the percentage of the funds expended for investments. Accordingly, the growth was accompanied only by minor changes in structure. The only significant change was that the percentage expended for social sciences grew. In spite of the

intentions of the science policy guidelines to the contrary, the basically extensive growth of the research base continued since 1969. We still hold the view that the new tasks can be solved only by an expansion of the research capacities and by the infusion of additional funds. This, in many instances, resulted in an unjustified increase in research expenditures. This trend still continues today. In addition, those socio-economic goals and preferences which would have necessitated the intensive development of the research base, the greater concentration of the intellectual and financial resources, and the more effective performance of the scientific work have been developed only gradually, and in some areas not at all.

Within the research base, the status of research in universities is the least favorable, to such an extent that in some locations even the conditions of modern education and the fulfilment of the long-range goals of training experts are jeopardized. There are major differences between the universities and, for example, the research institutes in terms of such factors as the research expenditures per researcher and the number of study trips abroad. The systematic and institutionalized inclusion of the intellectual capacities of the universities in the solution of our major research problems is inadequate. In the next period we must improve the financial support of the universities and other institutions of higher learning, and we must make sure that our universities keep up with scientific advancement so that they can perform their obligation of training experts on the basis of modern and multi-faceted scientific background. In our judgment, this is an important prerequisite for the modernization of university training, for the meeting of the increasing demands, and for the creation of the next generation of researchers. We must also realize that the level of university education must be raised primarily since better competence of the graduates affects the level of future research and development. And ultimately our overall efficiency depends on the utilization of the results of research and development.

We were also unsuccessful in meeting some other goals insofar as the development of our research base is concerned. There was no significant change in the percentage of research sites in the provinces, nor do we find adequate increases in the capacity of experimental plants and pilot plants, in spite of the fact that such plants were among the featured goals of the science policy guidelines. There are many reasons why we are behind in these areas: the organs responsible for science supervision must still evaluate and analyze some of these factors in detail.

One of the most exciting questions of science policy is the status of fundamental research and its relationship to research and development.

Our achievements in the field of fundamental research are acclaimed internationally. It is important that we maintain and strengthen our position in this regard. Insofar as the statistical data are concerned, they show no major differences from the past: in recent years, approximately 14 percent of the expenditures for research involved fundamental research projects. There are indications that the percentage expended for fundamental research decreased, although even so we do not compare unfavorably on the international scale. The problem is, however, that the decrease in expenditures for fundamental research shows a trend. This would be contrary to our science policy principles.

This is an important principle, one which is also included in the program declaration of our party: we must make sure that we carry out adequate fundamental research to provide the needed basis for scientific advancement. In contrast to some narrow-minded practicism, which still exists today, we must realize that fundamental research on the major fields of scientific endeavor is a prerequisite for mankind's progress, and that without fundamental research we can neither perform practical research in the future nor apply the findings of others for practical purposes. The sums expended for fundamental research, therefore, must grow to the same degree as the total expenditures for research and development. We must make sure that the special features of fundamental research, which are different from the features of economically oriented, so-called problem studies, are taken into consideration when we plan the research activities.

The resolution of the Political Committee considers increased technical and agricultural research volume of great importance. The term "increased technical and agricultural research" requires some explanation. It concerns not the featuring of certain science branches but of such research and development activities which directly serve technical progress and which are aimed at the accomplishment of specific economic and technical goals, such as new methods and their introduction into general use. This subject includes research and development over the entire range encompassing fundamental studies and the introduction of the results into practice. We deal not only with technical and agricultural research projects but also with studies in entirely different fields in the natural and social sciences, ranging from mathematics to economics. Acceleration of the rate at which science becomes a productive force — in broader terms, facilitation of the unfolding of the scientific and technical revolution — is made possible by interdisciplinary studies which encompass many scientific areas and range from fundamental research to the introduction of the results into practice.

According to a study, a major percentage of our research capacity is in the sphere of technical and agricultural research and development. This fact alone justifies special attention to these projects. But the primary reason why special attention is needed is that the effectiveness of the entire scientific research work depends primarily on the successes of technical and agricultural research and development. It is precisely these studies which ensure that the new discoveries and new research findings are practically utilized in production.

The goal of strengthening the relationship between science and practice is perhaps the most important feature of the science policy guidelines. From the perspective of eight years we believe that it was here that we made most progress; however, it is also here that we have most still to do. New production cultures were created with direct help from science. Also, with such help did we develop or improve our electronic, vehicle, rubber, and petrochemical industries, and did we build up our computer-technological industry. The utilization of scientific achievements in agriculture contributed materially to the solution of problems in the field of complex agricultural production facilities and animal husbandry. This fact, plus others, indicate that science must be a direct contributor to agricultural production. Almost all major research facilities participate today in meeting the research demands of industry and agriculture. The research and development work volume of the universities and the institutions of the Academy of Sciences increased many-fold since 1969. In some areas, such work is of decisive significance. Let us quote an example: The Central Research Institure of Physics, the Research Institute for Computer Technology and Automation, and the Research Institute of Agriculture of the Hungarian Academy of Sciences perform most of their work directly for the accomplishment of economic goals. This so far has not led to a lowering of the level of the scientific work. Quite to the contrary, it stimulated scientific advancement, better orientation of the selection of the research themes, and better institutional organization and research responsibility

Nonetheless, the major achievements in the practical orientation of science are not devoid of problems. The desirable interaction between the main directions of socio-economic development and the long-range goals of research and development on the one hand, and between international scientific cooperation and domestic research on the other hand, has not yet developed. Closely related to this factor is the fact that the theme selection of research and development has not narrowed and that we so far have not succeeded in concentrating our intellectual and financial resources to the desirable degree.

The central feature of our aims in the field of technical and agricultural research in the next period will be the aim of better coordinating our science-political and econo-political goals and tasks. On our agenda we must have such subjects as modernization of the production structure, featured development of research-intensive branches, preservation of our competitive position, and the like. The solution of these tasks is possible, and must be accomplished, by taking into consideration the totality of research and development, as well as the socio-economic relationships and interactions of the entire research and development activity. To some degree, all this will reduce the "protected status" of science, which it has enjoyed in the past. In the future, we will have to pay more attention to implement the principles of efficiency and economic benefits in the field of scientific research also — primarily from the point of view of applications and marketing — and we must realize the fact that the direct role of science, its effect, and its responsibility become increasingly important in the accomplishment of the economic goals. Insofar as science policy is concerned, all this means that we must consider effectiveness.

One of the most important means toward increasing the effectiveness of research work is the selectivity in selecting the themes, in outlining the major directions, and the appropriate selective expansion of the research base. Our goal must be to select by considering the goals of social and economic development in all areas of science. In the course of the implementation of the requirements of selective development, we must consider for each specific theme the "critical mass" of research capacity and those "thresholds" below which it does not pay to work in the theme concerned, or below which we would not be able to handle the subject in a manner that would withstand comparison with the international standards.

But we must also consider the fact that the possibility of creative work not directly related to existing social needs is not eliminated. We must therefore pay particular attention to those areas and schools for which we have high traditions or an international high reputation. We must ensure that we have "free capacity" left for our activities which are judged important and outstanding in the international sphere.

Of course, all this can become reality only if we restrict ourselves in some areas to just maintaining our earlier level and perhaps if we retrench in some other areas. Implementation of the selective research policy is a long-term task. It requires much patience and understanding; we must carefully take into consideration the special features of scientific work, and we must ensure the uninterrupted progress of scientific advancement. But the methods and procedures of practical work are not fully understood today.

We see the pressing need for advancement but we also see the difficulties associated with it. We know that major achievements can be realized through better management, for example by reducing the overlapping studies, by better theme orientation, and so forth; however, adaptation to the new tasks sometimes is accompanied by the emergence of serious existential questions. The leaders of research, the individual supervisory bodies, and — last, but not least — the party organs functioning in the scientific institutions must do much ensure that in answering, formulating, and solving these highly complex problems they meet both the needs for scientific advancement and economic growth, and also the needs and aims of the scientists concerned.

However, selectivity is only a method for increasing the effectiveness of research and development. The effectiveness of research can also be significantly improved by better, more systematic, and better organized cooperation among the research establishments and the production enterprises. From among the already tried forms of cooperation, perhaps target-oriented associations established for the solution of a research goal are the most successful. For example, the Central Research Institute of Physics, the Research Institute of Technical Physics, the Research Institute of Telecommunications, and the United Incandescent Lamp Factory joined forces with the aim of developing the manufacture and applications of highly complex integrated circuits. This is a good example how the use of sophisticated methods combines research and development on the one hand, and industry on the other hand. It seems that this approach toward establishing or concentrating the necessary scientific capacity may be used in other projects also. The association formed to realize the development of new numerically controlled machine tools, sponsored by the KGM [Ministry of Metallurgy and Machine Manufacture],demonstrates that this form of cooperation between research establishments and production enterprises is highly effective and should be encouraged in other appropriate areas also.

Today, the formation of such target-oriented associations involves some major and minor difficulties, and they do not usually operate smoothly and effectively. We must move even further ahead in coordinating the interests: we must first clarify the interests of the partners (the research establishments such as university departments or research institutions, and the enterprises), and we must also create the legal framework which simply but effectively regulates their operation, taking the actually existing conditions into consideration.

The practical utilization of the results of research is, as recent experience demonstrates, most effective in the enterprises' research establishments.

The themes of the enterprise's research laboratory are closely related to the development tasks of the enterprise, and the solutions created take due consideration of the possibilities and conditions that exist. We must also expect that the conditions for effectiveness will be best met in such establishments. The solution of the problems of the economy and the favorable effects of the industrial implementation of the results of research on operations and scientific advancement are all reasons for us to give preferential treatment for such establishments. They should enjoy priority in the next period, so that their role and importance increase within the research sphere as a whole. We should preferentially support the research apparatus of those large enterprises of which the work is related to the central development programs, of which the products are competitive and progressively developed, and of which the technological methods are advanced.

Our scientific base today is already so large that it may be regarded as an industrial system. Yet, it cannot be our goal to achieve all research results solely from the domestic research base. The goals of the science-policy guidelines aimed at getting rid of autarchy are more important today than they have ever been. It seems to us that to base our long-range production goals entirely on new domestic achievements is a realistic aim in only a very few areas of technical and agricultural research (for example in the pharmaceuticals industry or the manufacture of pesticides). In general, we must set ourselves up to be ready to follow the developments everywhere in the world and to adapt the results of research anywhere.

In recent times we did purchase more licences and know-hows; however, the percentage of this activity within the research and development expenditures is still very low. From the technical development fund we spent approximately 150 million forints for this purpose in 1969; in 1975 this sum increased to approximately 700 million forints. Yet, even the latter sum represents no more than approximately five percent of our total research and development expenditures. On the international scale, this is a very low percentage. Experiences gathered in recent years indicate that in most industrial and food-industry sectors we can maintain economic growth and product competitiveness best — or can increase these best — by making use of international accomplishments through the procurement of licences and know-hows, and in some cases by carrying out improvements on such knowledge. Impressive evidence to substantiate the validity of this approach is the manufacture of MAN engines, the introduction of complex crop-growing systems, the adoptation of high-yield Soviet wheat types, and raising poultry more efficiently. In the future, therefore, we must give a major role to the procurement of foreign scientific results, their adaptation to domestic conditions, and — where warranted — their domestic improvement.

It is important to coordinate the procurement of licences with domestic research and development, and it is also important to be well prepared for the procurement of the licences in scientific and technical terms. We must create an atmosphere in which research work aimed at adapting the licences is esteemed just as much as independent research. The creative utilization of research achievements and the study of making best use of the licences by improving them is worthy of the appreciation of the scientific community.

Improving the utilization of the results of research and creating closer relationships between research and production are major tasks of scientific activity. But these efforts by themselves are insufficient if they do not coincide with similar efforts by the production enterprises. There are many signs to indicate that not every enterprise treats the tasks of technical development at such a priority as it should. Some of the enterprises still fear the introduction of new scientific achievements because of the risks they believe are involved. They also shy away from the introduction of new, modern products, the use of modern technologies, and the administrative and organizational tasks involved in such introduction. This is to some extent also demonstrated by the fact that the enterprises do not utilize fully their technical development funds in many instances, so that increasing sums remain unused as the years go by.

The technical development fund is established from the price income according to a formula, which is different for the various products, depending on the research and development effort that it included in them. These formulas are periodically re-examined and modified if necessary. In spite of this fact, however, there is insufficient correlation in the establishment of the research and development funds. For example, the pharmaceutical enterprises finance research and development from their own profits, while these funds just accumulate in other enterprises, primarily in those dealing in products requiring relatively little research and development. The establishment of technical development funds should be improved by modification of these formulas in such a manner that these contradictions are eliminated and that research funds are created where research is needed most for the benefit of the economy as a whole. By establishing a harmony between the research needs and resources, we should achieve that the presently unused technical development funds contribute toward the accomplishment of our goals.

The problems requiring solution are of a great variety. For example, the problem of how to finance such research and development work is not yet solved, although this is a major condition of technical modernization in

many areas. We could list additional problems, for example the backwardness of the financial support of agricultural research and the unjustified disadvantages in the status of researchers in enterprises dealing with technical development. All these phenomena have in common the fact that their solution appears feasible not by science-political means and measures alone. What we need is, is a change in outlook on the part of researchers and the scientific community as a whole, the leaders of the enterprises, and the technicians working in the enterprises. The aim is to see that technical and agricultural development work is appreciated and its accomplishments are welcome by the enterprises. At the same time, the solution of these problems needs the overhaul of our entire leadership system, its adaptation to the demands of the present. We must also develop the necessary incentives and interests.

The leadership system of research and development has served well the coordination of the scientific tasks and the needs of society, and the realization of the science-policy goals. Development of the state science leadership at the present time is primarily a content-wise, not an administrative, problem. By creating better conditions for planning research and development, financing research and development, and improving the information system of research and development, we also create the conditions which make our science leadership system more effective within the present administrative structure.

Our science leadership must be built around the research programs; the accomplishment of our science-political goals, and of a closer relationship between economic and scientific activities, ahould be ensured by means of a program-oriented leadership. The National Long-Range Scientific Research Plan (OTTKT), related to the long-range socio-political, economic, and culture-political goals for the period ending in 1990, creates the necessary prerequisites for this; the emergence of the outlines of the specific social and economic goals permits us to define our activities needed in the field of science policy in a better founded and more systematic manner, so as to make optimum use of our intellectual and financial resources.

A very important task to be solved in our science leadership is to make research and development more systematic. Planning should be improved promarily in order to achieve better coordination with the economic policy. We must establish such a system for planning research and development which creates close relationship on all levels with the economic planning effort.

In our opinion, it is very important that in formulating the Sixth Five-Year Plan the economic development goals be taken into consideration, so that they can contribute effectively to the plans of the individual enterprises also, as well as to the plans of the research institutions and supervisory organs. It is an important task of ours to ensure that the planning of scientific research does not remain an "internal affair" of only a few science-supervisory organs.

That paragraph of the resolution of the Political Committee according to which our enterprises must prepare a medium-range research and development plan as part of their five-year plan is of major importance for this reason. It is this way that the foundations will be established for the new planning system — or that these foundations become complete — and that the central goals will become amalgamated with the local endeavors, which reflect properly the economic realities.

In our opinion it is desirable for research and development to have a position in the medium-range plan of the national economy which befits its importance. It is a novel task for us to make our medium-range plans in such a manner that we establish specific, clearly defined goals and set down the tasks, problems, and intermediate programs which are needed for their accomplishment.

In addition to making plans which are "tight," meaning that they are well defined and set down in the framework of specific programs, we also need plans for such studies of which the direct goal is not some specific new product or technology, or a method for quality control or compliance determination, but of which the aim is to elucidate some specific information, to examine some relationships, or to explain the laws governing some phenomena. In formulating the goals of such activities, we must make sure that the researchers have a wide independence: they must be able to create ideas and realize them within the existing economic limitations over as wide a field as possible. In setting down the financial wherewithals of such projects, we must take into consideration the scientific achievements already demonstrated by the researcher, as well as the scientific level of the team concerned. It is very important to minimize the bureaucratic and formalistic elements of scientific planning and accounting, making the method of reporting and administration as simple and decentralized as possible.

The OTTKT reamins one of the most important frameworks of continued planning. There is no need for a thorough re-examination of the OTTKT; however, we should "keep it up to date" occasionally, soon the next time.

One goal of the work already in progress is to coordinate the long-range plans with the task of modernizing the producive structure; another goal is to coordinate them with our foreign-trade goals. Also, we must define more clearly the activities demanded by the OTTKT. We must also remember the comprehensive planning system for research and development now in preparation; we must define clearly the relationships among the long-range and medium-range research and development plans. In conjunction with this, we must examine the further activities needed toward the modernization of research financing, so that there is eventually a closer relationship between the thematic and financial plans, and that financial means and measures effectively contribute toward the accomplishment of the featured goals.

By and large, we were able to complete successfully the intentions of the science-policy guidelines for the preferential advancement of the social sciences. In the orientation of the themes of social-scientific studies and in the concentration of the research capacity toward the most important problems of our society, an important role was played by the national and ministry-level OTTKT committees, as well as by the Committee of Agitation and Propaganda of the Central Committee, which proposed themes after the Tenth and Eleventh Party Congresses.However, the development was quite differentiated among the science branches; the new theme orientation which emerged in recent years pointed out the internal disproportions of social-scientific studies. The capacity of today's research base capable of exploring the current social processes and phenomena is still not in proportion with the needs of society. The fragmented, yet administratively rigid research base also makes effective research and more efficient concentration difficult. The research establishments dealing with social sciences, including the institutions of the Academy and the university departments, are basically disciplinary in character, while the needs and the main featured research themes require more and more an interdisciplinary approach. We did not really succeed in breaking down the walls separating the individual scientific disciplines, and even the cooperation within a given discipline was not always as good as it should have been. The lack of interdisciplinary approach reduces the generalizability of theoretical scientific factors, decreases the effectiveness of a scientific attitude, and stands in the way of the practical utilization of the results of research. Nor did we solve the problem of including the scientists working in public collections (museums, archives, libraries) in the featured research programs.

The favorable political atmosphere and the good relationship which developed in recent years between politics and science contributed effectively to the thematic development of social-scientific research. These factors also confirmed the validity in real life of the position of the Party in connection with freedom of research. As a result of this position, the researchers dared to deal with such themes which were earlier regarded as "sensitive" and thus neglected. They also introduced new research trends and included other subjects in earlier projects. As a result of all these factors, social sciences as a whole analyzes our socialist society, our national past, and our culture more comprehensively and more courageously than ever before. This is another factor which enabled the modern achievements of the social sciences to be used in the ideological and political educational work.

The positions of Marxism-Leninism in the field of social sciences are firm. There is no such thing as an overall anti-Marxist attitude in the social sciences. The influence of non-Marxist views has also decreased. Nationalism is still evident in some areas, and there is also evidence of influence by bourgeois social science trends.

A debate with non-Marxist views has always been an important source of the theoretical growth of Marxism; this is still true today. At the same time, the clear-cut implementation of the positions of Marxism-Leninism necessitates the answering of non-Marxist views by the exploration of the true social processes, by the Marxist analysis of the theoretical and methodological problems related to the internal development of the social sciences, and by formulating the answers in a Marxist fashion.

At the same time, we must make more vigorous and deliberate our opposition to non-Marxist views as they emerge in the field of social sciences; we must make it clear that debate is a means of Marxist ideology, which is an unavoidable duty of the Marxist social scientists. Strengthening of the theoretical debating spirit is also an important prerequisite for the further vitalization of the social-scientific community.

We must fight those influences which slight the role of ideological battle in international class warfare or the need of a resolute attitude against non-Marxist views in ideological education. The role of the social sciences becomes increasingly important both in the ideological battle on the international fronts and in the theoretical education work; thus, the increase of the research work in terms of ideological effectiveness and the meeting of the international ideological needs is an important aspect of the work of the social scientists.

The scientific life developed in a healthy way since the promulgation of the science-policy guidelines. Scientific creative work unfolded in a favorable social and political atmosphere, and the scientific work enjoys increased social prestige. There has been a laudable increase in the public-life activities of the researchers, and the scientific community became more democratic.

In spite of the considerable improvement, however, many problems of scientific life still are in need of a solution. We still encounter groupings without principles, professional jealousy; personal antagonisms still play a role in certain cases. Although there has been progress, the situation is still not satisfactory in the critical evaluation of the applications of scientific achievements and accomplishments. In this connection, I mention only a single problem: scientific qualification. This example illustrates most clearly our problems.

The institutional framework and the forms of scientific qualification developed in accordance with the guidelines. There is now a legal way for honoring collective work, and scientific qualifications may be applied for and obtained on the basis of scientifically valuable achievements. Unfortunately, these possibilities remained unutilized to a large degree in recent times; thus, their role and effects in scientific life are inadequate. Unfortunately, there developed a peculiar "aristocraticism" in the area of scientific qualifications, and we see evidence of certain excessive "dissertation-centrism" which unfavorably affects the appreciation of adaptation activities and the studies carried out with the aim of improving knowledge obtained through the purchase of licences.

However, scientific qualification has also problems which are related primarily to the negative phenomena of scientific life, and which affect our science policy as a whole.

Lack of principle in the evaluation of scientific values undermines the foundations of scientific work; thus, they jeopardize the accomplishment of our science-policy goals. A case — which does not happen frequently — that might initiate a process contrary to the best interests of our socialist moral norms may lead to the deterioration of scientific achievements and to the establishment of disinterest. Our concern is supported by the fact that the level of doctoral dissertations is lower than we would like to see, so that the doctoral qualifications lost some of their earlier high scientific value. In our opinion, this is not a good situation, one which should be remedied. We have therefore initiated a debate on scientific qualification with the ultimate aim of creating an atmosphere more conducive to scientific advancement.

We would like the researchers and experts who participate in the debate to approach the subject from many angles, considering the social ramifications of scientific qualification. We need an honest and responsible debate; we cannot be satisfied merely with the superficial discussion of the phenomena; we must elucidate the causes and underlying relationships from many points of view. For example, we should seek an answer to such questions as: how much does the system meet the needs of scientific advancement?; has society not overestimated the importance of a scientific title?; do we appreciate sufficiently that honest and meaningful work which does not lead to utilization?; how could the scientific qualification system serve better our goal for better scientific achievements and the best possible meeting of our social and economic goals from the sciences' point of view?

Whilw we should retain the principles and the scientific qualification system as a whole, we should implement the principles more systematically and so that they better serve the accomplishment of our science-policy and personnel goals, so that the high requirements and purity of the scientific qualification system becomes a true contributor to the individual disciplines and science as a whole.

As the June meeting of the Central Committee has already declared, the science-policy principles proved their value, and will remain in effect for a long time to come for the guidance of the development of our scientific life. We do not need new guiding principles at the present time. However, from time to time we do need — precisely to contribute to the faster implementation of the long-term goals of the science policy — to review the experiences, the new trends in science, and the new needs of society. Only if we take these into consideration will we be able to lay down the science-political tasks for a short or long period ahead so that they meet the needs of the time.

Our science policy is an organic part of the policy of our Party; its continuity and changes are closely related to the continuity and renewal desires of our Party, and to the need and ability to adapt to new conditions and tasks. The guiding principles of our science policy are very clear, and the principles are valid, having been confirmed by the developments in scientific research activity. Implementation of the principles today necessitates our stepping beyond the narrow interpretation of

of science policy as a sector in its own right. We must make sure that science policy is more closely correlated with our economic policy, with the cultural policy of our Party, and our goals of public education. This would be the greatest assurance for our scientific life, and would enable it to contribute even more effectively than before toward the accomplishment of our national-economic, socio-political, cultural, public-educational, and public-training goals.

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HUNGARY

BRIEFS

MICROPROCESSORS FOR MONITORING SYSTEMS--Engineers of the Instrument Industry Research Institute have set up a system for monitoring boilers on an experimental basis. The system utilizes microprocessors. The prototype of the equipment has been put into operation at the control center of the Capital Heating Works. In case of danger or breakdown, alarm signals reach the center via ultra short wave network. [Budapest NEPSZAVA in Hungarian 12 Nov 77 p 1]

CAPACITORS FOR HUNGARY--The Siemens firm has installed a production line for plastic film capacitors at the Remix Radio Engineering Factory. The line consists of fully automatic machines and is capable of turning out 8 million capacitors annually. Remix has also purchased the license and know-how for two types of capacitors from Siemens. These components will be marketed under the name of "Stiroflex." [Paris ELECTRONIQUE ACTUALITES in French 4 Nov 77]

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ROMANIA

IMPROVEMENTS IN PREVENTION, TREATMENT OF TUBERCULOSIS NECESSARY

Bucharest PNEUMOFTIZIOLOGIA in Romanian No 2, Apr-Jun 77 pp 65-69

/Article by Prof C. Anastasatu and P. Mihailescu/

/Text/ It is well known that during 1976, as a result of critical remarks and instructions given the health sector by the higher party leadership and by party secretary general Nicolae Ceausescu, personally, in relation to health problems including the course and development of the fight against tuberculosis and on the basis of the subsequent surveys and discussions in the Executive Council of the Ministry of Health and in the Higher Health Council, the concept and organization of the program to prevent and combat tuberculosis involved a fundamental restructuring designed to result in radical improvements.

If we realistically survey the status of tubercular endemic in this country, in comparison not only to the previous status in Romania but also to the current status in other countries, in spite of the dwindling which occurred in the evolution of tuberculosis in recent years, it is clear that we cannot be satisfied with our ranking in the context of the other socialist countries and European countries. This has put an end to the exaggeratedly optimistic tendencies 8-10 years ago according to which tuberculosis was to have been eradicated shortly. The negative consequences of these tendencies -- which mainly involved diverting the attention from serious aspects of the matter -- have had repercussions to this day.

Moreover, in the conceptual and organizational area, an end was put to the obsolete and inadequate formula which mainly underlay the fight against tuberculosis in this country during the last decades. According to this formula, tuberculosis allegedly was the exclusive matter of a specialized network -- a network developed as much as possible but equally costly -- and the elimination if not even the eradication of the disease, could only be achieved by the inevitably limited forces of this network. This concept had a negative impact not only on some phthysiologists in their cooperation with other specialists but also on most of the forces that comprised the basic health network and other specialities involved in the fight against tuberculosis, making them believe that they were not supposed to play any role in this area.

Orientation

In light of these major deficiencies and of others of a circumstantial nature which did or did not result from them and also in light of the current orientation of WHO, resulting from the experience involved in the application of simpler and more economical systems of fight against tuberculosis integrated into the basic health network, the leadership of the Ministry of Health, in conjunction with the Institute of Phthysiology, formulated a set of measures designed to upgrade, in this country as well, the integration of the primary projects for the prevention and combating of tuberculosis in the activity of the overall health network, respectively in the duties of general practitioners and of various specialists. These measures were embodied in Order No 31 of 22 January 1977 issued by the Ministry of Health and published in the Bulletin of the Ministry of Health, No 2, 1977.

This order is based on the concept of integration, according to which the fight against tuberculosis is a task of the whole health network, under the leadership of the Ministry of Health and the Health Directorates, with the scientific-technical involvement of the Institute of Phthysiology and of the clinics of phthysiology, under the direct field guidance of phthysiological specialists and with the active support of general practitioners, epidemiologists, internists, pediatricians, and other specialists who are allotted specific tasks in the detection, treatment, and prophylaxis of pulmonary and extrapulmonary tuberculosis.

Under these new regulations, the older requirement of the former individual tuberculosis network, for developing cooperative relations with the overall health network and with the other specialized networks at that time -- a requirement which was never effectively met because it did not have a legal basis -- has now acquired a wider and most efficient base than the one of cooperation. This is so because the basic health network and all the specialists mentioned above from now on have mandatory, and not optional, tasks in the prevention and treatment of tuberculosis.

Of course, we must realize what is the position of the phthysiologist in this integrated system of fight against tuberculosis, a position which is well defined under the above-mentioned order. In their capacity as specialists -- besides the current tasks of the TB Dispensary, integrated as a TB service or section in the Territorial Polyclinic -- the phthysiologists will increasingly have the task of permanently training health personnel in antitubercular projects, of ensuring the quality and efficiency required for these projects, of field checking and effectively monitoring the development of the projects, of evaluating their technical and operational results, and of studying and mastering

new methods for continuously upgrading diagnosis, treatment, the recovery of patients, and the prophylaxis of new infections and morbidity cases.

The detection of tuberculosis is mainly based on the bacteriological examination of the sputum in all the symptomatic subjects who occur, regardless of locations, at the level of the basic health network: on X-ray examinations combined with bacteriological examinations of the groups of the population which involve higher risks of morbidity, and on the extension and amplification of the epidemiological filiation surveys. In order to prevent new infections and morbidity it is necessary to detect the new cases of tuberculosis as early as possible.

Chemotherapy as a primordial factor of the fight against tuberculosis, based on the strictly controlled application of the standardized systems mastered by the Institute of Phthysiology and on the integration of their application, in the outpatient stage, into the basic health network, must lead -- as was already demonstrated that it can lead -- to the rapid liquidation of all new and old sources of tuberculous infection. It must also lead to the massive decrease in the risk of new infections and morbidity in children, to the further reduction of the incidence of superinfection tuberculosis in adults, and in the most complete and prompt recovery of the work capacity of the treated and cured subjects.

The prophylaxis of tuberculosis, based on chemotherapy, BCG vaccination, and chemoprophylaxis, all integrated into the basic health network, must result in the strengthening of the specific resistance and in the massive reduction of morbidity in children, in the decrease in the morbidity caused by tuberculosis in adults with higher morbidity risk, in the overall reduction of the current level of the endemic, and in catching up with other countries in this fight.

Tasks

It is known that under this five-year plan, the program for the prevention and treatment of tuberculosis has provisions for 1980 which involve: reaching and even more reducing, where possible, the level of tuberculosis morbidity of 60°/oooo, the incidence in children of 8°/oooo with the eradication of serious cases, the mortality of under 4°/oooo, and the annual index of days of work disability caused by tuberculosis to 40 for every 100 employees.

For the purpose of achieving and exceeding these objectives and in light of the orientation pointed out, specific tasks were outlined for each sector or field of activity, with a few new facets which we would like to highlight.

In the area of detection of tuberculosis, use must be made of all the available methods, with the greatest possible effectiveness.

The X-ray examinations, under the conditions of a decline of the tuberculous endemic, no longer involve the whole adult population, but focus on specific territories where there persists a higher epidemiological potential, which manifests itself by morbidity in children, especially by the appearance of serious forms. The main emphasis will be placed -- as pointed out above -- on the periodical examination of the periclitated and periclitating populational groups.

The X-ray apparatus, modernized on the basis of the domestic production of new equipment, will be mainly located in polyclinics, with conditions created for the prompt examination of all symptomatic subjects. The use of individual health cards for particular categories of people will make it easier to keep the evidence of the groups liable for periodical control and its results.

The prospective large scale of bacteriological examinations and especially of microscopic sputum tests will require the restructuring of laboratories, involving a better territorialization. The progressive introduction of fluorescence microscopy will increase the effectiveness of the procedure and ensure meeting the needs in terms of tests.

The collection of quality pathological products is of great importance. Hence, especially in the outpatient units, collection rooms must be arranged and a strictly supervised sputum collection must be ensured with the involvement of specially trained medium-grade health personnel.

In the infant and adolescent population the election method for detecting the tuberculous infection and disease is tuberculin testing, coupled, when advisable, with X-ray and bacteriological examinations. The simplification of the reading and the standardization of the curative and prophylactic measures in light of the result turn the PPD intradermoreaction into a technique within the reach of all specialists and especially of pediatricians and general practitioners.

The epidemiological filiation survey, with improvements and extended beyond the family environment, also at the work place, in the workshop, at school, and so on, must become an actual method for detecting unknown sources of contagious infection and also people with nonmanifest occult first infections, which, however, may develop into patent tuberculosis, and sometimes into serious forms of the disease, when prophylactic measures are not applied promptly.

In the area of the treatment of tuberculosis, considered not only as a method for the recovery of patients but also as a method of prophylaxis, the standardization of therapeutical conditions, practically their reduction to three combinations of tuberculostatics, and their strictly supervised intermittent administration (SST) over a shorter period but with the obtaining of a culture negativation proportion of 98-100 percent points out the broad prospects for outpatient treatment after a short hospitalization during the contagious period. In this connection, we may state that the rural medical dispensary properly passed the test of integration. It has also become a reliable factor in the area of antitubercular chemotherapy. Moreover, it must be pointed out that the 98-100 percent negativation in patients ipso facto means 98-100 percent elimination of the sources of infection in the territory involved.

Under the new technical regulations for the prevention and treatment of tuberculosis (Order No 31) for the first time provisions are made for treatment of extrarespiratory tuberculous localizations, which, in view of the unique nature of the disease, are based on principles which are identical to those underlying the treatment of pulmonary tuberculosis.

In the area of prophylaxis the program must be significantly stepped up. In addition to the above-mentioned standardized chemotherapy, we must more effectively apply all the prophylactic measures which break the chain of the transmission of the infection or which strengthen the specific resistance to tuberculosis.

BCG vaccination at birth and the vaccinations according to the vaccination calendar, as is known, provide proper protection to the susceptible population against tuberculous infection and diseases. In this area of great importance are the constant evaluation and the greater technicality of vaccination.

Chemoprophylaxis, without losing its significance, is greatly reduced in terms of primary treatment. This method is only applied in the cases with morbidity risk. The administration of isoniazid must also be strictly supervised, just as chemotherapy. Hence, there is a transition from quantity to higher quality.

In the case of infants in intensely bacillary sites, whose risk in terms of morbidity and serious evolution is significant, the chemoprophylaxis used involves treatments with two combined tuberculostatics.

The fight in the site, with all the measures involved -- from the epidemiological survey, vaccination, chemotherapy, and chemoprophylaxis up to periodical examination of contacts and health education -- is a central activity and a key factor of the antitubercular fight. The wellknown watchword "no respite for tuberculosis" must be heeded in every tubercular site until the source

of infection is neutralized and all contacts are effectively protected during the critical period and kept out of any danger.

In the area of the organization of the antitubercular fight no special new developments are looming. However, Order No 31 of the Ministry of Health makes official and specifies the duties of the county phthysiologist and of the County Commission for Treatment of Tuberculosis, as an organ for the integration of the antitubercular projects. Furthermore, specified are also the particular tasks for the prevention and treatment of tuberculosis allotted chief section physicians in the county hospitals (internists, surgeons, obstetricians, and so on) and especially the heads of the pediatrics sections, and the epidemiologists and directors of territorial hospitals. The practitioners in the urban and rural dispensaries, in the factory dispensary and in the school dispensary, under the new conditions, become the major allies of the phthysiologists, genuine assistant phthysiologists for the territory involved and for their units. Constantly trained and supervised by the phthysiology section in the polyclinic, the practitioner must become capable of ably and promptly completing all his duties in terms of prophylaxis and prophylactic treatment in tuberculosis.

The Institute of Phthysiology and the clinics of phthysiology, as technical bodies of the Ministry of Health, with a comprehensive activity of medical assistance, of technical specialized aid for the entire territory of the country and of training cadres and of scientific research, must play a special role in this integrated system of antitubercular fight. The research plan with the focus on resolving the current problems of detection, treatment, prophylaxis, and organization, is designed, on the basis of the constant utilization of the field results, to further substantiate the tactics and strategy in the antitubercular fight, permitting the optimalization, in progress, of the measures of fight in light of the new aspects which the declining tubercular endemic involves now and will involve in subsequent years in this country.

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END